

## WATERSHED MANAGEMENT AREA 12

### EASTERN MONMOUTH COUNTY DRAINAGE

These watersheds drain the eastern portions of Monmouth County and flow in one of two directions. One portion drains into the Raritan estuary by way of Sandy Hook Bay. The waterways included within this portion are the Shrewsbury River, the Navesink River and a series of small Raritan Bay tributaries. The other portion drains directly into the Atlantic Ocean and includes the Shark and Manasquan Rivers. The area includes the following watersheds:

Matawan Creek  
Shark River

Navesink River  
Manasquan River

Shrewsbury River  
Wreck Pond Brook

#### Summary of ambient physical/chemical monitoring stations and classifications

##### Station Name

##### Classification

Manasquan River at Squankum

FW-2 Trout Maintenance

The following monitoring locations have been discontinued as of 1991:

Jumping Brook near Neptune City (FW-2 Nontrout)  
Shark River near Neptune (FW-2 Trout Maintenance)  
Marsh Bog Brook at Squankum (FW-2 Nontrout)

#### OVERALL MANAGEMENT AREA ASSESSMENT

##### - Swimmable Support Status:

##### WATERWAY

##### LOCATION

##### STATUS

Manasquan River

at Squankum

No Support

- **Summary of Aquatic Life Support Status (Number of stations within each assessment category).** Note: See the Biological Assessment Table located at the end of this section for details regarding macroinvertebrate assessments within the watershed management area.

No Impairment: 4

Mod. Impairment: 30

Severe Impairment: 9

**MAPS here**

## NAVESINK AND SHARK RIVERS

### WATERSHED DESCRIPTION

The Navesink River drains an area of 95 square miles. The Shrewsbury River drains an area of 27 square miles and the Shark River an area of 23 square miles. Tributaries to these rivers include the Swimming River, Yellow Brook, Big Brook, Mine Brook, and Willow Brook to the Navesink; Parkers Creek, Oceanport Creek, and Little Silver Creek to the Shrewsbury River; and Jumping Brook (7 miles long) to the Shark River (10 miles). Small tidal streams drain northern Monmouth County to Raritan Bay and Sandy Hook Bay. These creeks include Cheesequake Creek, Matawan Creek and Waackaack Creek. Sub-watersheds include the Navesink, Shrewsbury, and Shark Rivers and tributaries to Raritan Bay. Population centers in this area include Asbury Park, Long Branch, Red Bank, Keyport and Eatontown. Deal Lake lies in this area as do many small ponds. Also here are the Swimming River Reservoir and the Glendola Reservoir - both major potable water impoundments.

Land use in this watershed is about one-third forested, with a smaller percentage agricultural. An appreciable amount of land is used for residential/commercial/industrial uses, with about 15 percent being wetlands and water. Of the approximately 35 NJPDES permitted discharges, one-quarter are municipal and three-quarters are industrial/commercial. The waters in this region have been classified FW-2 Trout Maintenance, FW-2 Nontrout and SE-1.

The Navesink estuary supports substantial hard (*Mercenaria mercenaria*) and soft clam (*Myra arenaria*) populations. The Navesink and adjoining Shrewsbury River produce almost the entire soft clam fishery for New Jersey and, as a result, the Navesink estuary has been the target since 1981 of a major interagency effort to reduce nonpoint source bacterial pollution (NJDEP, 1993).

### WATER QUALITY ASSESSMENT

Prior to 1991 and through the second half of the 1980s there were two ambient monitoring stations collecting physical/chemical data within these watersheds - Jumping Brook near Neptune City (FW-2 Nontrout) and Shark River near Neptune (FW-2 Trout Maintenance). During that time period, monitoring found water quality to be excellent and good in Jumping Brook and the Shark River, respectively. The only water quality indicators found at problematic levels in Jumping Brook were occasional (25 percent) fecal coliform counts greater than 200 MPN/100ml. In the Shark River, nutrient and fecal coliform levels were slightly higher than in Jumping Brook. Fecal coliform levels had a geometric mean of 121 MPN/100ml, with 39 percent of samples greater than 200 MPN/100ml. Total phosphorus was above the 0.1 mg/l criterion in 13 percent of the samples collected. Dissolved oxygen was sufficient throughout the year in the two streams. Both streams are moderately acidic.

Deal Lake has been impaired since the 1950s due to sedimentation, poor sanitary quality and excessive aquatic macrophyte and algae growth. A 1983 study indicated that overland runoff is responsible for most of the sediment and nutrients.

Within the shellfish harvesting portions of the Navesink River the major pollution problem is high bacterial loadings from nonpoint sources. The highest concentrations occur in the segment of the river near Red Bank. Water quality steadily improves as one proceeds downstream until conditions are acceptable at the lower third of the river (NJDEP, 1993). The poorest sanitary quality is observed during the summer, especially following a rainfall. Substantial improvements in water quality in the Navesink River have occurred within this region during the late 1980s and early 1990s as a direct result of reductions of nonpoint source loadings. For the first time in 25 years, the potential now exists for unrestricted shellfish harvesting within the assessed shellfish harvesting waters of the Navesink.

### **Biological Monitoring**

Biological monitoring within the Navesink and Shark River watersheds indicate either moderate to severe impairment throughout the freshwater portions of these watersheds (see the Biological Assessment Table located at the end of this section). No monitoring locations were observed to be non-impaired.

### **POINT SOURCE ASSESSMENT**

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No waste water dischargers are reported to be under enforcement actions by the NJDEP within the Navesink and Shark River watersheds at the present time. Willow Brook has in the past been reported to suffer from the contribution of both point and nonpoint sources. A number of industrial point sources combined with suburban/agricultural runoff and septic systems were all suspected causes of the elevated nutrients and bacteria found in the brook. The current status is not known. Also in the past, Imperial Oil Co. containing a hazardous waste site was affecting Lake Lefferts and Birch Swamp Brook with organics, metals and PCBs. The Seaview Square Mall has been built on an old dump site and was suspected of contaminating Deal Lake with metals and polynuclear aromatic hydrocarbons.

### **NONPOINT SOURCE ASSESSMENT**

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Horse farms, construction activities, and urban runoff are believed to be the principal nonpoint sources of pollution in this region. These have brought about siltation, nutrient loading, and excess bacterial contamination in the local rivers. Bacteria from horse farms and urban runoff had contaminated many of the shellfish harvesting beds in the downstream reaches of these rivers.

In the Navesink watershed both agricultural and suburban construction activities have created severe pollution problems. Crop production and horse farming, especially the stockpiling of manure has resulted in excessive nutrients and bacterial loadings. In addition, depressed dissolved oxygen levels threaten the local fresh water fishery in the Navesink. Urban

development impacts the Navesink; largely by contributing stormwater runoff and septic tank leachate, both of which are believed by local authorities to contribute to siltation, nutrient loading and oil and grease contamination.

In the tidal Navesink River an inter-agency nonpoint source control project has been underway to alleviate the bacterial contamination of shellfish growing waters by suburban and agricultural runoff. In concert with this effort, the Federal Natural Resources Conservation Service is sponsoring a soil erosion and animal waste control project in the watershed. As the direct result of this inter-agency effort, there have been notable reductions in bacterial loadings from coastal development, agricultural waste and marina- and boat-related contamination (NJDEP, 1993).

The Shark River watershed appears to be impacted more by suburban pollution sources and less by agricultural sources than the Navesink River watershed. Agricultural activity is suspected of contributing some runoff from pasturelands - resulting in nutrient and silt loads entering the waterway. In this watershed, road and housing construction, as well as urban runoff and landfills, predominate as the suspected principal nonpoint pollution sources. Local construction on roadways and housing are suspected of contributing to severe siltation and turbidity, especially in the headwaters. In addition, construction activities expose acid-producing soils which, in turn, can cause a pH depression in local streams. Widespread suburban runoff from both suburban surfaces has sent excess silt, road salts and bacteria into the Shark River, its tributaries and lakes. Landfills and other forms of waste storage are also suspected sources of pollution in the Shark River. In the headwaters at Tinton Falls, volatile organics have been reported in the past to be leaking into the local waters during rain. In Neptune City, underground waste storage tanks had been reported to be leaking petroleum products.

As mentioned earlier, Deal Lake is impaired by sedimentation, poor sanitary quality and excessive aquatic macrophyte and algae growth. Restoration efforts began in 1989 and included public education and the planned construction of four sediment retention basins. Efforts at constructing the basins are still ongoing.

The Shrewsbury River is affected by many of the same problems that impact the other local waters. Agricultural runoff from croplands, pastures, and animal holding areas is believed to be contributing excess nutrients, silt, and bacteria to surface water. Horse manure at Monmouth Race Track had been contributing high levels of bacteria to the river, however, enforcement efforts by NJDEP in concert with the Monmouth County Health Department have significantly reduced this source. Increases in suburban and commercial construction in the watershed and runoff from storm sewers and suburban surfaces have sent excess silt, salts, nutrients, and oil and grease into the waterway. This has caused high water temperatures, low dissolved oxygen levels, and restrictions in shellfish harvesting. Some nonpoint pollution in the Shrewsbury watershed is also suspected as originating from septic systems and waste disposal sites.

**DESIGNATED USE ASSESSMENT**

Aquatic life designated use support in the Shark and Navesink Rivers is a mixture of partial support and nonsupport. Shellfish growing waters in this region are classified as Special Restricted (further treatment required) for harvesting. No current sanitary data exists for assessing the primary contact support within the freshwater portions of the Navesink and Shark Rivers.

## MANASQUAN RIVER

### WATERSHED DESCRIPTION

The Manasquan River drains an area of 81 square miles and flows for 23 miles southeasterly from Freehold Township in Central Monmouth County to the Manasquan Inlet on the Ocean/Monmouth County line. Here, it empties into the Atlantic Ocean at Manasquan Inlet. The headwaters flow from a rural/agricultural area to the densely populated shore. The Manasquan River is connected in its lower reach to Barnegat Bay through the Point Pleasant Canal. The Manasquan River is fed by the major tributaries of Debois Creek, Mingamahone Creek and Marsh Bog Brook. Population centers include Point Pleasant, Howell Township, Freehold Township, Freehold Borough and Wall Township. The tides affect the Manasquan River up to a point approximately two miles east of the Garden State Parkway.

About half of the land use in this watershed is crop/pastureland, although large-scale development is taking place in many areas. There are a number of small lakes and ponds, most of which are used for recreational purposes. Of the 11 NJPDES permitted dischargers in the watershed, one is municipal, the rest are industrial/commercial. The waters are classified FW-1, FW-2 Trout Maintenance, FW-2 Nontrout and SE-1.

### WATER QUALITY ASSESSMENT

#### Physical/Chemical Water Quality

##### Locations: Manasquan River at Squankum

**Dissolved Oxygen:** Acceptable.

**Temperature:** One violation (of 18 samples) of the upper criterion for trout maintenance waters.

**Nutrients:** Inorganic nitrogen is acceptable; the median value is 0.52 mg/l with no values greater than 0.89 mg/l. Total phosphorous is also acceptable, with only 2 of 18 samples exceeding the criterion of 0.10 mg/l. The median value was 0.055 mg/l.

**Bacteria:** Moderate bacterial levels were recorded at Squankum. The geometric mean was 217 MPN/100 ml, with 33% of samples exceeding the 400/100ml criterion.

**Heavy Metals:** One copper sample approached but did not exceed the chronic criteria for aquatic life support. One of the seven lead records exceeded the chronic criteria for aquatic life support for lead. Elevated levels of lead, zinc, and mercury have been detected within the sediments of the Manasquan (NJDEP, 1990).

**Summary:** Within the freshwater portions of the Manasquan, nutrients and dissolved oxygen levels are acceptable. Instream temperatures, however, are

high, with several readings approaching or exceeding 20° C. Lead and possibly copper within the water column may impair aquatic life support at Squankum. Studies have found elevated lead, zinc, and mercury within the sediments of the Manasquan River (NJDEP, 1990). Sanitary quality is marginally poor.

Within the Manasquan River estuary, low summertime dissolved oxygen levels (sometimes below the 4.0 mg/l criterion for SE 1 waters) are reported by the Monmouth and Ocean County Health Departments (Monmouth-Ocean County, 1996). Sanitary quality is poor here also, causing the upper portions of the estuary to be condemned for shellfish harvesting and the mid to lower portions to be classified as Special Restricted for harvesting.

### **Biological Monitoring**

With a few exceptions, biological monitoring found moderately to severely impaired biota within the Manasquan watershed (See the Biological Assessment Table located at the end of this section). The exceptions are Stan and Squankum Brooks in Howell Township and the lower portion of Mingamahone Brook in Squankum, all of which were observed to be non-impaired.

### **POINT SOURCE ASSESSMENT**

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One permitted surface water discharge is reported to be undergoing an enforcement action within the watershed. In July 1994, The Department executed an ACO with Nestle Beverage Co. in Freehold Township. The ACO required Nestle to improve their collection and disposal of contaminated stormwater runoff.

The Manasquan River and Marsh Bog Brook had in the past experienced significant point source loadings. These had contributed to excessive nutrients and, as a result, low levels of dissolved oxygen in some sections of these streams. In the Freehold Borough area, a number of industrial facilities discharged to tributaries of the Upper Manasquan. The Lone Pine Landfill, a Superfund hazardous waste site, is located in the headwaters of the river and contributes pollutants (volatile organics and metals) to the river. In addition, the Bog Creek Farm site has been reported to have contaminated the North Branch Squankum Brook with volatile organics. As of 1994, all municipal wastewater facilities within the Manasquan watershed have been eliminated and their wastewater flows transferred to the Ocean County UA Northern facility for treatment and discharge to the Atlantic Ocean. The Manasquan estuary has only one remaining NJPDES permitted discharge, a pump-and-treat groundwater remediation system in Point Pleasant Beach.

### **NONPOINT SOURCE ASSESSMENT**

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The Manasquan River watershed receives a wide range of nonpoint source pollutants. Sources include agriculture, waste disposal and suburban development. Here, as in other eastern coastal watersheds, bacterial contamination of waterways is a widespread and significant problem.

In the Manasquan River itself, agricultural nonpoint source pollution impacts are reported to be largely centered in the region just east of Route 9. Here, croplands, pastureland, feed lots and animal holding areas have combined to cause nutrient loading, siltation, and high bacterial levels in the river. Non-agricultural problems include dam and reservoir construction (Manasquan Reservoir), which has led to local stream bank modification and the loss of riparian vegetation. This has caused erosion, siltation, and turbidity in the stream which in turn have posed a threat to the local freshwater fishery. Housing construction within the downstream end is also contributing to siltation and turbidity problems, while moderate to severe levels of runoff from urban surfaces and road salting have led to salinity and nutrient loading. Within the estuary, the high concentrations of waterfowl have contributed to the buildup of bacteria (Monmouth - Ocean Counties, 1996).

Tributaries to the Manasquan received much the same types of nonpoint pollution as does the Manasquan itself. Squankum Brook is suspected of receiving runoff from cropland, pastures, and animal holding areas. Marsh Bog Brook is suspected of being impacted by agricultural runoff from cropland and animal holding areas. Local landfills and septic systems are also suspected and known sources of pollution, respectively. DeBois Creek is known to be impacted by siltation from both road and home construction. Here, tree cutting during road construction has led to the destabilization of stream banks. DeBois Creek is also degraded by urban runoff. Lakes assessed in the watershed are experiencing high bacterial levels and eutrophication as a result of inputs from waterfowl and road runoff.

### **DESIGNATED USE ASSESSMENT**

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The Manasquan River at Squankum will not support the swimmable (primary contact) designated use because of elevated fecal coliform levels.

These streams in general will either not support or only partially support the aquatic life support designated use based upon macroinvertebrate assessments. The exceptions to this are Stan and Squankum Brooks in Howell Township and the lower portion of Mingamahone Brook in Squankum, all of which fully support the use.

The tidal Manasquan River is condemned for the harvesting of shellfish in the tidal reaches downstream to the Rt. 70 bridge. Downstream of the bridge, the waters are classified as Special Restricted.

## BIOLOGICAL ASSESSMENT TABLE: AREA 12

Mgt Area	Watershd	Site ID	Water Body	Location	Municipality	Sample Date	Biological Impairment Rating
12	36	AN0456	Matawan Ck	Morganville Rd	Madison Twp	Aug 2, 1994	moderately impaired
12	36	AN0457	Gravelly Bk	Church St	Aberdeen Twp	Aug 1, 1994	severely impaired
12	36	AN0458	Wilksons Bk	Church St	Aberdeen Twp	Aug 1, 1994	severely impaired
12	36	AN0459	Flat Ck	Middle Rd	Raritan Twp	Aug 1, 1994	severely impaired
12	36	AN0460	Mahoras Ck	Rt 35	Middletown Twp	Aug 1, 1994	severely impaired
12	36	AN0461	Town Bk	Spruce Rd	Middletown Twp	Aug 2, 1994	moderately impaired
12	38	AN0462	McClees Ck	Whippoorwill Rd	Middletown Twp	Aug 3, 1994	moderately impaired
12	38	AN0463	Poricy Bk	Navesink R Rd	Middletown Twp	Aug 3, 1994	moderately impaired
12	38	AN0464	Nut Swamp Bk	Normandy Rd	Middletown Twp	Aug 3, 1994	severely impaired
12	38	AN0465	Hop Bk	Roberts Rd	Holmdel Twp	Aug 9, 1994	moderately impaired
12	38	AN0466	Hop Bk	Willow Bk Rd	Holmdel Twp	Aug 3, 1994	moderately impaired
12	38	AN0467	Willow Bk	Schank Rd	Holmdel Twp	Aug 9, 1994	moderately impaired
12	38	AN0468	Willow Bk	Willow Bk Rd	Colts Neck Twp	Aug 3, 1994	severely impaired
12	38	AN468A	Willow Bk trib	Igoe Rd	Marlboro	Oct 31, 1990	moderately impaired
12	38	AN0469	Big Bk	Rt 79	Marlboro Twp	Aug 9, 1994	severely impaired
12	38	AN0470	Big Bk	Cross Rd	Colts Neck Twp	Aug 3, 1994	moderately impaired
12	38	AN0471	Yellow Bk	Rt 537	Freehold Twp	Aug 9, 1994	moderately impaired
12	38	AN0472	Yellow Bk	Creamery Rd	Colts Neck Twp	Aug 9, 1994	moderately impaired
12	38	AN0473	Mine Bk	Creamery Rd	Colts Neck Twp	Aug 9, 1994	moderately impaired
12	38	AN0474	Swimming R	Swimming R Rd	Lincroft	Aug 3, 1994	moderately impaired
12	38	AN0475	Hockhockson Bk	Hockhockson Rd	Colts Neck Twp	Aug 3, 1994	moderately impaired
12	38	AN0475	Hockhockson Bk	Hockhockson Rd	Colts Neck Twp	Feb 16, 1995	moderately impaired
12	38	AN0475	Hockhockson Bk	Hockhockson Rd	Colts Neck Twp	May 8, 1995	moderately impaired
12	38	AN0475	Hockhockson Bk	Hockhockson Rd	Colts Neck Twp	Nov 3, 1995	non-impaired
12	38	AN0476	Pine Bk	Tinton Ave (Rt 537)	Tinton Falls	Aug 3, 1994	moderately impaired
12	38	AN476A	Pine Bk	Squankum Rd	Macedonia	Oct 31, 1990	moderately impaired
12	41	AN0477	Whale Pd Bk	Larchwood Ave	Oakhurst	Aug 4, 1994	moderately impaired
12	41	AN0478	Poplar Bk	Almyr Ave	Deal	Aug 4, 1994	moderately impaired

# **BIOLOGICAL ASSESSMENT TABLE continued:**

Mgt Area	Watershd	Site ID	Water Body	Location	Municipality	Sample Date	Biological Impairment Rating
12	42	AN0479	Jumping Bk	Essex Rd	New Shrewsbury Twp	Aug 4, 1994	moderately impaired
12	42	AN0480	Jumping Bk	Corlies Ave	Neptune Twp	Sep 20, 1994	moderately impaired
12	42	AN0481	Shark R	Shark R Sta Rd	Reevytown (Wall Twp)	Oct 30, 1990	moderately impaired
12	42	AN0481	Shark R	Shark R Sta Rd	Reevytown (Wall Twp)	Aug 4, 1994	severely impaired
12	42	AN0482	Shark R	Remsens Mills Rd	Remsensmill	Sep 20, 1994	moderately impaired
12	47	AN0483	Wreck Pd Bk	Old Mill Rd	Wall Twp	Aug 10, 1994	moderately impaired
12	47	AN0484	Hannabrand Bk	Old Mill Rd	Wall Twp	Aug 10, 1994	non-impaired
12	47	AN0484	Hannabrand Bk	Old Mill Rd	Wall Twp	Nov 3, 1995	moderately impaired
12	43	AN0485	Manasquan R	off Turkey Swamp Rd	Freehold Twp	Apr 11, 1989	moderately impaired
12	43	AN0485	Manasquan R	off Turkey Swamp Rd	Freehold Twp	Jul 8, 1992	moderately impaired
12	43	AN0485	Manasquan R	off Turkey Swamp Rd	Freehold Twp	Oct 7, 1992	moderately impaired
12	43	AN0485	Manasquan R	off Turkey Swamp Rd	Freehold Twp	Jan 21, 1993	moderately impaired
12	43	AN0485	Manasquan R	off Turkey Swamp Rd	Freehold Twp	Apr 8, 1993	non-impaired
12	43	AN0486	Debois Ck	Rt 33	Freehold Twp	Sep 14, 1994	moderately impaired
12	43	AN0487	Debois Ck	Strickland Rd	Freehold Twp	Sep 14, 1994	severely impaired
12	43	AN0488	Manasquan R trib	Strickland Rd	Howell Twp	Sep 14, 1994	moderately impaired
12	43	AN0489	Manasquan R	Rt 9	Wyckoff Mills	Sep 14, 1994	moderately impaired
12	43	AN489A	Turkey Swamp Bk	blw Turkey Swamp Lk	Freehold Twp	Oct 30, 1990	severely impaired
12	43	AN0490	Manasquan R	W Farms Rd	Howell Twp	Aug 9, 1994	moderately impaired
12	43	AN0491	Marsh Bog Bk	Cranberry Bog Rd	Howell Twp	Aug 9, 1994	moderately impaired
12	43	AN0492	Marsh Bog Bk	Yellow Bk Rd	Squankum	Aug 9, 1994	moderately impaired
12	43	AN0493	Manasquan R	Rt 547	Squankum	Aug 9, 1994	moderately impaired
12	43	AN0494	Mingamahone Bk	Cranberry Bog Rd	Howell Twp	Aug 9, 1994	moderately impaired
12	43	AN0495	Mingamahone Bk	Rt 524	Squankum	Aug 9, 1994	non-impaired
12	43	AN0496	Stan Bk	Easy St	Howell Twp	Oct 30, 1990	non-impaired
12	43	AN0496	Stan Bk	Easy St	Howell Twp	Mar 1, 1991	non-impaired

**BIOLOGICAL ASSESSMENT TABLE continued:**

12	43	AN0496	Stan Bk	Easy St	Howell Twp	May 17, 1991	non-impaired
12	43	AN0496	Stan Bk	Easy St	Howell Twp	Jul 10, 1991	moderately impaired
12	43	AN0497	Squankum Bk	Spur 549	Howell Twp	Aug 10, 1994	non-impaired
12	43	AN0498	Manasquan R	Hospital Rd	Wall Twp	Aug 10, 1994	moderately impaired